1438

Drinking Water Surveillance Program

WELLAND WATER SUPPLY SYSTEM

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WELLAND
WATER SUPPLY SYSTEM

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1989

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

WELLAND WATER SUPPLY SYSTEM
1989 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1989, there were 65 supplies being monitored.

The Welland Water Supply System treats water from Lake Erie via the Welland Recreational Canal using conventional treatment. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. The Welland plant has a design capacity of 86.4 X 1000 M^3/day and supplies a population of approximately 46,000.

Water samples from the plant, raw and treated and one distribution system site, were taken on a monthly basis and analyzed for the presence of approximately 180 parameters. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polyaromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analyzed in June and November only.

A summary of results is shown in Table A.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Samples were analyzed monthly for the presence of approximately 110 Organics. Levels did not exceed health related guidelines.

During 1989, the DWSP sampling results indicated that the Welland Water Supply System produced good quality water at the plant and this quality was maintained in the distribution system.

TABLE A

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS

SUMMARY TABLE BY SCAN

	SCAN	RAW TESTS	RAW POSITIVE	RAW %POSITIVE	TREATED TESTS	TREATED POSITIVE	TREATED %POSITIVE	SITE 1 TESTS	SITE 1 POSITIVE	SITE 1 %POSITIVE
	BACTERIOLOGICAL	35	29	82	33	3	9	36	5	13
	CHEMISTRY (FLD)	36	36	100	72	72	100	138	137	99
	CHEMISTRY (LAB)	252	223	88	240	174	72	425	342	80
	METALS	288	156	54	288	152	52	541	320	59
	CHLOROAROMATICS	168	0	0	168	0	0	154	0	0
	CHLOROPHENOLS	12	0	0	12	0	0	.	.	.
	PAH	171	0	0	190	0	0	.	.	.
	PESTICIDES & PCB	395	0	0	395	0	0	322	0	0
	PHENOLICS	12	6	50	12	6	50	.	.	.
	SPECIFIC PESTICIDES	65	0	0	65	0	0	11	0	0
	VOLATILES	348	0	0	347	57	16	319	46	14
TOTAL		1782	450		1822	464		1946	850	

NO HEALTH RELATED GUIDELINES WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

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INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1989, there were 65 plants being monitored. Appendix A carries a full description of the DWSP.

The DWSP was initiated for the Welland Water Treatment Plant in January of 1989.

This report contains information and results for 1989.

PLANT DESCRIPTION

The Welland Water Treatment Plant is a conventional treatment plant that treats water from Lake Erie via the Welland Recreational Canal. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. The Welland plant has a design capacity of 86.4 X 1000 M^3/day and flows for day of sampling ranging from 27.1 x 1000 m^3/day to 52.7 x 1000 m^3/day. The

plant serves a population of approximately 46,000.

The plant location is shown in Figure 1. Plant process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

SAMPLE LOCATIONS

Water samples were obtained from three DWSP approved locations;

i) Raw - The water originated from the lowlift pump prior to chlorination and was sampled through a stainless steel sample line. The sample tap is located at the lowlift pump.

ii) Treated - The water originated from the highlift discharge after the addition of all treatment chemicals and was sampled through a stainless steel sample line. The sample tap is located on the treated water main after the highlift pumps.

iii) Site 1 - This site is approximately 1.0 kilometre from the plant. Water is sampled through existing copper plumbing. The sample tap is located in the basement laundry room.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

WELLAND WATER TREATMENT PLANT

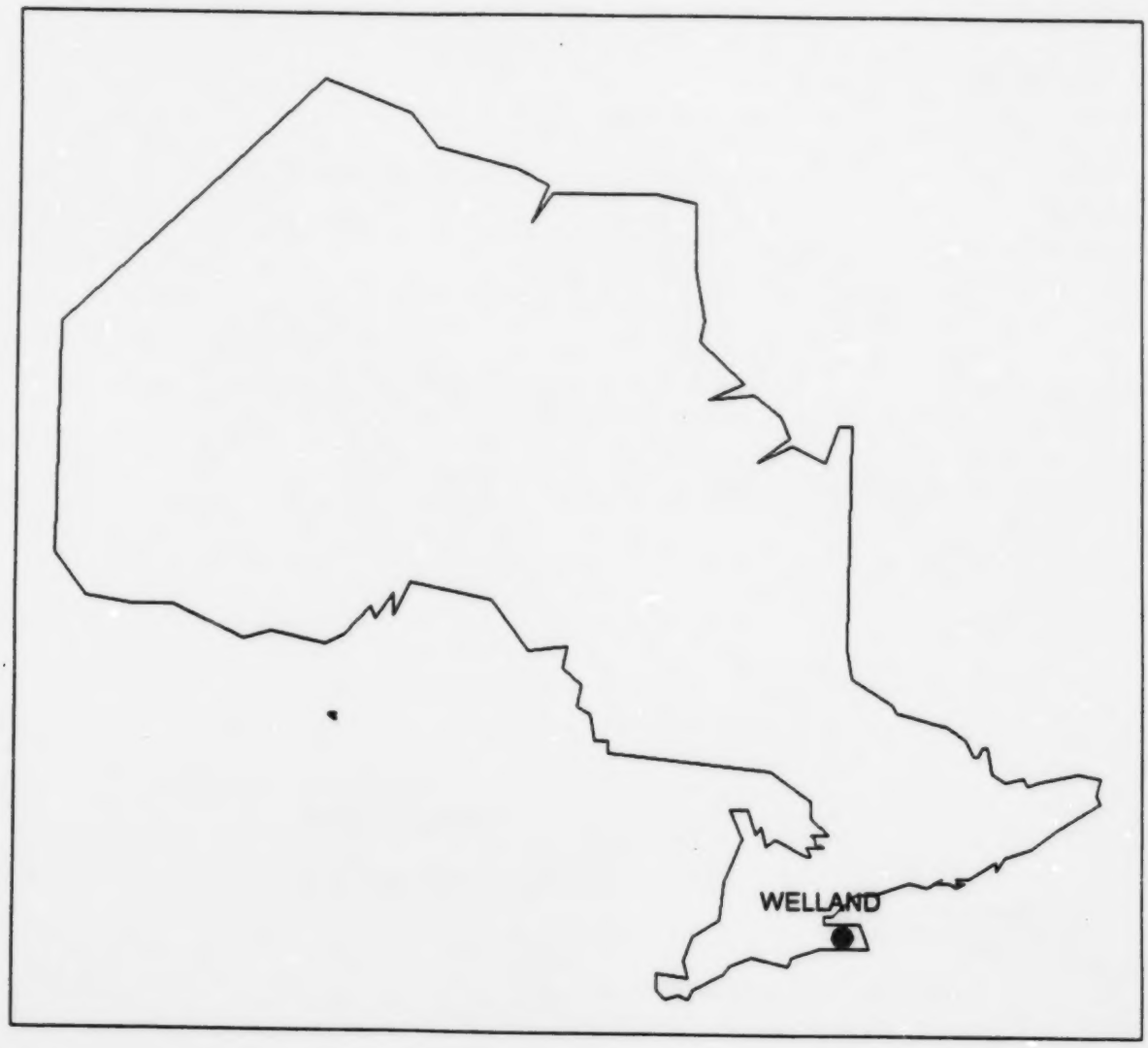

FIGURE 2

WELLAND WATER SUPPLY

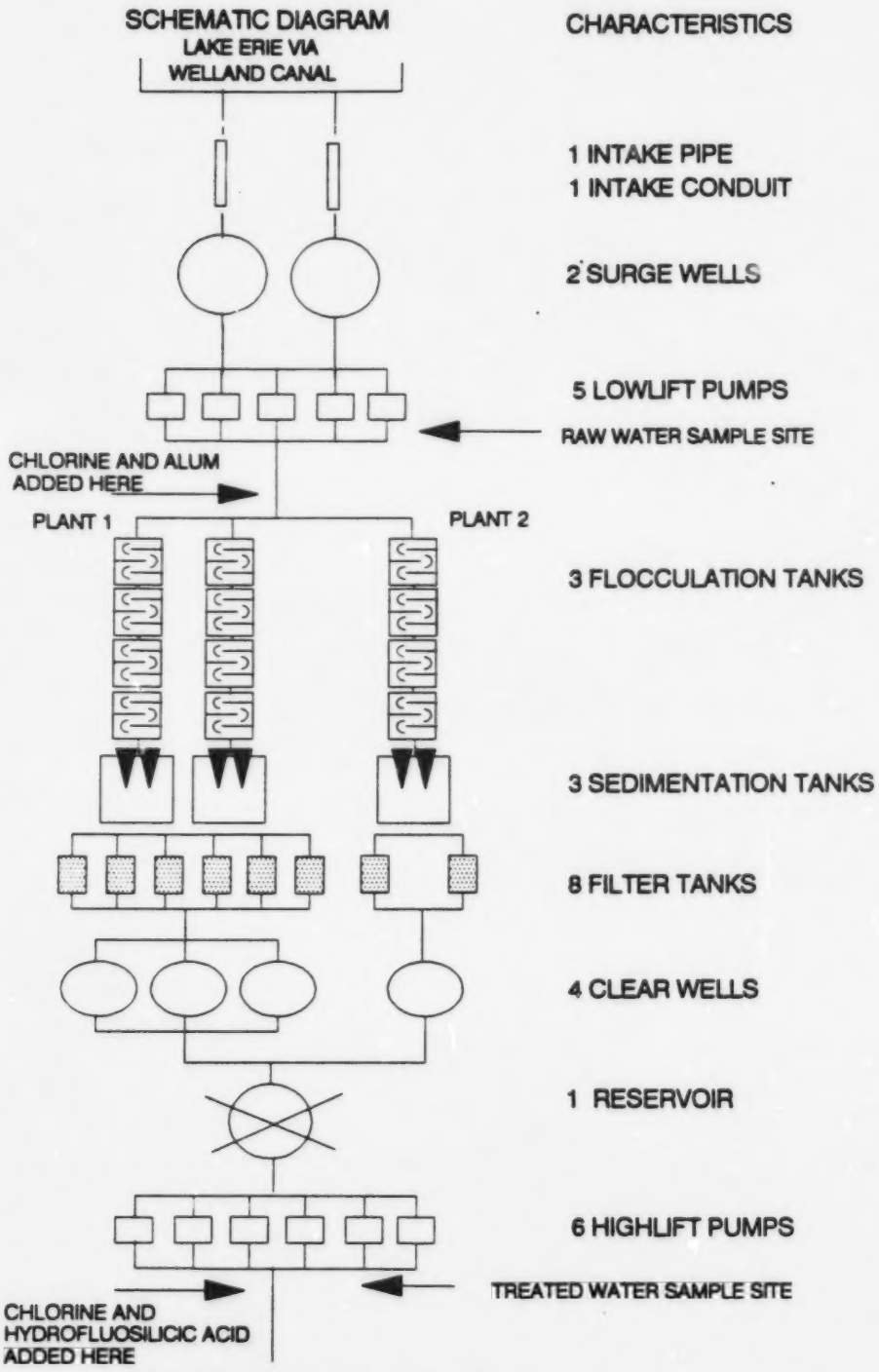

TABLE 1

PARAMETER	LOCATION	FREQUENCY
Chlorine Residuals - free	Top of filters	continuous every shift
	Treated water	continuous every shift
- total	Top of filters	continuous every shift
	Treated water	continuous every shift
pH	Raw water	continuous
	Treated water	continuous
Temperature	Raw water	continuous
	Treated water	continuous
Turbidity	Raw water	continuous
	Treated water	continuous

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

WELLAND WATER SUPPLY SYSTEM

LOCATION:	CROSS STREET N WELLAND, ONTARIO BOX 292 (416-735-7420)
SOURCE:	RAW WATER SOURCE - LAKE ERIE
DESIGN CAPACITY:	86.4 x 1000M^3/DAY
OPERATION:	MUNICIPAL
PLANT SUPERINTENDENT:	T. BURCH
MINISTRY REGION:	WEST CENTRAL
DISTRICT OFFICER:	MR. J. MAYES

MUNICIPALITY SERVED	POPULATION
WELLAND PELHAM THOROLD	46,000

SAMPLING AND ANALYSIS

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations, two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing due to leaching from (or deposition on) the plumbing system. The only analysis carried out on the standing samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site

would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner.

Plant operating personnel perform analyses on parameters for process control (Table 1).

The Welland Water Treatment Plant raw and treated water and one distribution system location were sampled for the presence of approximately 180 parameters on a monthly basis beginning in January. The Specific Pesticides and Chlorophenols scans were sampled in June and November only. Polyaromatic Hydrocarbons and Phenolics are only analyzed in the raw and treated water at the plant. As of August, analysis of the triazine pesticides was dropped from the distribution system.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP data base as submitted by plant personnel.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples

analyzed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters. These are currently under

review. When an ODWO is not available, guidelines/limits from other agencies are consulted. The Parameter Listing System (PALIS), recently published (ISBN 0-7729-4461-X) by the MOE, catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Many of the compounds detected are naturally occurring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.**

Bacteriology

Positive results for the Bacteriology scan were present twice in the treated water and five times in the Site 1 water. The positive

parameters were Standard Plate Count and Total Coliform Background.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a geometric mean of 5 or more samples). High Standard Plate Counts were present in the August treated water sample. While no indicators of unsafe water were detected at this time, the high Standard Plate Count may generally be a result of the higher temperatures in the summer months.

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. The routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. Routine bacteriological monitoring, as outlined in the ODWOs, is carried out by the operating authority.

Inorganic and Physical

Laboratory and Field Chemistry

The results for the Laboratory Chemistry and Field Chemistry scans were below any applicable health related ODWOs.

It is desirable that the Temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of the delivered water may increase in the distribution system due to the warming effect of the soil in late summer and fall and/or as a result of higher temperatures in the source water. The desired ODWO was exceeded ten times in the treated waters.

The ODWOs recommend a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters to provide an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and would possess a tendency to form scale deposits and result in excessive soap consumption. The Welland water had hardness values ranging from 124 mg/L to 145 mg/L.

The Langelier Index is used extensively in estimating the corrosion potential of water. An increasingly negative index indicates the

increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for Welland is consistently positive.

As part of the treatment plant process, hydrofluosilicic acid is added to the treated water (Table 3). Where fluoridation is practised, the Fluoride concentration recommended on the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. This level was generally maintained as can be seen in the fluoride values reported in Table 5.

Metals

The results reported for the Metals scan were below any applicable health related ODWOs.

Iron and Manganese levels were lower in the treated water as compared to the raw water. This is a result of the treatment process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

Elevated levels of Copper, Lead, Nickel and Zinc were detected in the standing samples as compared to the free flow distribution samples. This indicates that very small quantities of these metals were leached from the household plumbing as the water stood

overnight. Although the Langelier Index indicates minimal potential for corrosion, some metals will be leached in standing samples in most supplies.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of residual Aluminum in the treated water is important to indicate the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as Al in the water leaving the plant to avoid problems in the distribution system. Aluminum values exceeded the ODWO operational guideline in seven treated water samples.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that no chloroaromatics were detected.

Chlorophenols

The results of the Chlorophenols scan showed that no Chlorophenols were detected.

The maximum desirable concentration of phenolic substances in drinking water is 2.0 µg/L. This limit has been set primarily to prevent the occurrence of undesirable tastes and odours,

particularly in chlorinated water. Phenolics were detected at levels ranging from 0.6 to 1.6 µg/L in the raw water and 0.4 to 1.6 µg/L in the treated water.

Pesticides and PCB (Polychlorinated Biphenyls)

The results of the Pesticides and PCB scan showed that no PCBs were detected and that three pesticides were detected:

Alpha BHC

Lindane

Atrazine

There are several isomers of BHC (Benzene Hexachloride). Gamma BHC is the active ingredient of the pesticide Lindane, while alpha BHC is the isomer predominantly found in surface waters from the Great Lakes Basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels; five times in the raw water, four times in the treated water and five times in the Site 1 water.

Lindane was detected at a trace level in one treated water sample.

Atrazine was detected at a trace level; once in the raw water and the treated water.

Specific Pesticides

Results of the Specific Pesticides scan showed that no specific pesticides were detected.

Polynuclear Aromatic Hydrocarbons (PAHs)

The results of the PAH scan showed that no PAHs were detected.

Volatiles

The results of the Volatiles scan showed that nine parameters, other than Trihalomethanes(THMs), were detected:

Benzene
Toluene
Ethylbenzene
M-Xylene
O-Xylene
Styrene
1,1,1 Trichloroethane
Carbon Tetrachloride
Tetrachloroethylene

Benzene was detected in the July treated water at 1.05 µg/L and in the Site 1 water at 0.65 µg/L. It was also detected in the August treated water sample at 0.50 µg/L. Health and Welfare Canada has a Maximum Acceptable Concentration of 5.0 µg/L for Benzene in drinking water. Benzene was also detected at trace levels; once in

the raw water, three times in the treated water and six times in the Site 1 water.

Toluene was detected in the July treated water at 1.70 µg/L, in the Site water at 0.90 µg/L and in the August treated water at 1.0 µg/L. The Aesthetic Objective (AO) used by Health and Welfare Canada for Toluene in drinking water is 24 µg/L. Toluene was also detected at trace levels; once in the raw water, five times in the treated water and eight times in the Site 1 water. The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology.

Ethylbenzene was detected at trace levels; once in the raw water, five times in the treated water and six times in the Site 1 water.

Meta-Xylene (M-Xylene) was detected in the July treated water at 2.0 µg/L and in the August treated water at 1.0 µg/L. Health and Welfare Canada have an AO of 300 µg/L for Total Xylenes in drinking water. M-Xylene was also detected at trace levels; once in the treated water and four times in the Site 1 water.

Ortho-Xylene (O-Xylene) was detected in the July treated water at 0.90 µg/L and in the August treated water at 0.60 µg/L. The AO for Total Xylenes would also apply. O-Xylene was also detected at trace levels; three times in the treated water and six times in the Site 1 water.

The detected trace levels of Styrene are also considered to be laboratory artifacts resulting from the polystyrene shipping containers. The sporadic background levels from this source are in the order of 0.05 µg/L.

The volatiles listed above are typically found on an occasional basis at other water supplies included on the DWSP.

1,1,1 Trichloroethane was detected at trace levels; twice in the raw water, twice in the treated water and three times in the Site 1 water.

Carbon Tetrachloride was detected at trace levels; three times in the treated water and twice in the Site 1 water.

Tetrachloroethylene (T-chloroethylene) was detected at trace levels;, once in the treated water and twice in the Site 1 water.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane, Chlorodibromomethane and Total

THMs were detected in all treated water samples. Bromoform was detected at trace levels. Trihalomethanes were detected at trace levels in three raw water samples. All Total THM occurrences, ranging from 28.6 to 53.7 µg/L, were well below the ODWO of 350 µg/L.

CONCLUSIONS

The Welland Water Treatment Plant for the sample year of 1989 produced good quality water at the plant and this quality was maintained in the distribution system.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1989.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS SAMPLE DAY CONDITIONS FOR 1989

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)			
			PRE-CHLORINATION	COAGULATION	FLUORIDATION	POST-CHLORINATION
DATE	DELAY* TIME(HRS)	FLOW (1000M3)	CHLORINE	ALUM LIQUID	HYDROFLUOSILICIC ACID	CHLORINE
JAN 11	2.5	30.2	1.45	11.50	1.01	.18
FEB 08	2.5	28.2	1.05	7.51	1.04	.14
MAR 08	2.5	28.1	1.05	7.10	.91	.15
APR 05	4.0	30.2	1.13	6.91	1.06	.24
MAY 03	4.0	29.5	1.23	5.56	.88	.20
JUN 06	3.0	36.2	1.40	8.00	1.01	.30
JUL 04	4.0	52.7	1.80	7.70	1.00	.20
AUG 08	4.0	36.3	1.80	8.90	.	.33
SEP 05	5.0	35.9	1.50	8.41	1.06	.21
OCT 10	3.5	28.6	1.25	6.20	1.06	.06
NOV 07	4.0	27.1	1.25	3.80	1.12	.14
DEC 05	4.0	29.9	1.35	9.60	1.25	.13

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL	FECAL COLIFORM MF	11	8	0	.	.	.	.	.	.
	STANDRD PLATE CNT MF	.	.	.	11	3	0	12	4	0
	TOTAL COLIFORM MF	12	9	0	11	0	0	12	0	0
	T COLIFORM BCKGRD MF	12	12	0	11	0	0	12	1	0
*TOTAL SCAN BACTERIOLOGICAL		35	29	0	33	3	0	36	5	0
*TOTAL GROUP BACTERIOLOGICAL		35	29	0	33	3	0	36	5	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	12	12	0	23	22	0
	FLD CHLORINE FREE	.	.	.	12	12	0	23	23	0
	FLD CHLORINE (TOTAL)	.	.	.	12	12	0	23	23	0
	FLD PH	12	12	0	12	12	0	23	23	0
	FLD TEMPERATURE	12	12	0	12	12	0	23	23	0
	FLD TURBIDITY	12	12	0	12	12	0	23	23	0
*TOTAL SCAN CHEMISTRY (FLD)		36	36	0	72	72	0	138	137	0
CHEMISTRY (LAB)	ALKALINITY	12	12	0	11	11	0	23	23	0
	CALCIUM	12	12	0	11	11	0	23	23	0
	CYANIDE	12	0	0	12	0	0	12	0	0
	CHLORIDE	12	12	0	12	12	0	23	23	0
	COLOUR	12	7	5	12	0	11	23	0	23
	CONDUCTIVITY	12	12	0	11	11	0	23	23	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHEMISTRY (LAB)	FLUORIDE	12	12	0	12	11	0	23	23	0
	HARDNESS	12	12	0	11	11	0	23	23	0
	IONCAL	12	12	0	12	11	0	23	23	0
	LANGELIERS INDEX	12	12	0	11	11	0	22	22	0
	MAGNESIUM	12	12	0	11	11	0	23	23	0
	SODIUM	12	12	0	11	11	0	23	23	0
	AMMONIUM TOTAL	12	12	0	12	2	4	23	3	8
	NITRITE	12	11	1	12	1	9	23	0	20
	TOTAL NITRATES	12	12	0	12	11	0	23	22	1
	NITROGEN TOT KJELD	12	12	0	11	11	0	23	23	0
	PH	12	12	0	11	11	0	23	23	0
	PHOSPHORUS FIL REACT	12	3	8	12	4	3	.	.	.
	PHOSPHORUS TOTAL	12	10	2	11	3	7	.	.	.
	SULPHATE	12	12	0	11	11	0	23	23	0
	TURBIDITY	12	12	0	11	9	2	23	19	4
*TOTAL SCAN CHEMISTRY (LAB)		252	223	16	240	174	36	425	342	56
METALS	SILVER	12	0	3	12	0	3	23	0	9
	ALUMINUM	12	12	0	12	12	0	23	23	0
	ARSENIC	12	5	7	12	7	5	23	13	10
	BARIUM	12	12	0	12	12	0	23	23	0
	BORON	12	12	0	12	12	0	23	23	0
	BERYLLIUM	12	0	6	12	0	9	23	0	16

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS	CADMIUM	12	0	1	12	0	1	23	0	5
	COBALT	12	0	9	12	0	9	23	0	17
	CHROMIUM	12	5	6	12	7	4	23	16	7
	COPPER	12	10	2	12	7	5	23	22	1
	IRON	12	8	4	12	0	5	23	0	10
	MERCURY	12	2	5	12	5	4	12	0	2
	MANGANESE	12	11	1	12	12	0	23	23	0
	MOLYBDENUM	12	12	0	12	12	0	23	23	0
	NICKEL	12	2	9	12	0	11	23	10	10
	LEAD	12	8	3	12	3	7	23	23	0
	ANTIMONY	12	11	1	12	12	0	23	23	0
	SELENIUM	12	0	6	12	0	9	23	0	17
	STRONTIUM	12	12	0	12	12	0	23	23	0
	TITANIUM	12	12	0	12	11	1	23	21	2
	THALLIUM	12	0	4	12	0	3	23	1	9
	URANIUM	12	11	1	12	11	1	23	20	3
	VANADIUM	12	0	12	12	7	5	23	10	13
	ZINC	12	11	1	12	10	2	23	23	0
*TOTAL SCAN METALS		288	156	81	288	152	84	541	320	131
*TOTAL GROUP INORGANIC & PHYSICAL		576	415	97	600	398	120	1104	799	187
CHLOROAROMATICS	HEXACHLOROBUTADIENE	12	0	0	12	0	0	11	0	0
	123 TRICHLOROBENZENE	12	0	0	12	0	0	11	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHLOROAROMATICS	1234 T-CHLOROBENZENE	12	0	0	12	0	0	11	0	0
	1235 T-CHLOROBENZENE	12	0	0	12	0	0	11	0	0
	124 TRICHLOROBENZENE	12	0	0	12	0	0	11	0	0
	1245 T-CHLOROBENZENE	12	0	0	12	0	0	11	0	0
	135 TRICHLOROBENZENE	12	0	0	12	0	0	11	0	0
	HCB	12	0	0	12	0	0	11	0	0
	HEXACHLOROETHANE	12	0	0	12	0	0	11	0	0
	OCTACHLOROSTYRENE	12	0	0	12	0	0	11	0	0
	PENTACHLOROBENZENE	12	0	0	12	0	0	11	0	0
	236 TRICHLOROTOLUENE	12	0	0	12	0	0	11	0	0
	245 TRICHLOROTOLUENE	12	0	0	12	0	0	11	0	0
	26A TRICHLOROTOLUENE	12	0	0	12	0	0	11	0	0
*TOTAL SCAN CHLOROAROMATICS		168	0	0	168	0	0	154	0	0
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	2345 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.
	2356 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.
	245-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	246-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	PENTACHLOROPHENOL	2	0	0	2	0	0	.	.	.
*TOTAL SCAN CHLOROPHENOLS		12	0	0	12	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PAH	PHENANTHRENE	11	0	0	12	0	0	.	.	.
	ANTHRACENE	11	0	0	12	0	0	.	.	.
	FLUORANTHENE	11	0	0	12	0	0	.	.	.
	PYRENE	11	0	0	12	0	0	.	.	.
	BENZO(A)ANTHRACENE	11	0	0	12	0	0	.	.	.
	CHRYSENE	11	0	0	12	0	0	.	.	.
	DIMETH. BENZ(A)ANTHR	2	0	0	4	0	0	.	.	.
	BENZO(E) PYRENE	11	0	0	12	0	0	.	.	.
	BENZO(B) FLUORANTHEN	11	0	0	12	0	0	.	.	.
	PERYLENE	11	0	0	12	0	0	.	.	.
	BENZO(K) FLUORANTHEN	11	0	0	12	0	0	.	.	.
	BENZO(A) PYRENE	4	0	0	6	0	0	.	.	.
	BENZO(G,H,I) PERYLEN	11	0	0	12	0	0	.	.	.
	DIBENZO(A,H) ANTHRAC	11	0	0	12	0	0	.	.	.
	INDENO(1,2,3-C,D) PY	11	0	0	12	0	0	.	.	.
	BENZO(B) CHRYSENE	11	0	0	12	0	0	.	.	.
	CORONENE	11	0	0	12	0	0	.	.	.
*TOTAL SCAN PAH		171	0	0	190	0	0	0	0	0
PESTICIDES & PCB	ALDRIN	12	0	0	12	0	0	11	0	0
	ALPHA BHC	12	0	5	12	0	4	11	0	5
	BETA BHC	12	0	0	12	0	0	11	0	0
	LINDANE	12	0	0	12	0	1	11	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	ALPHA CHLORDANE	12	0	0	12	0	0	11	0	0
	GAMMA CHLORDANE	12	0	0	12	0	0	11	0	0
	DIELDRIN	12	0	0	12	0	0	11	0	0
	METHOXYCHLOR	12	0	0	12	0	0	11	0	0
	ENDOSULFAN I	12	0	0	12	0	0	11	0	0
	ENDOSULFAN II	12	0	0	12	0	0	11	0	0
	ENDRIN	12	0	0	12	0	0	11	0	0
	ENDOSULFAN SULPHATE	12	0	0	12	0	0	11	0	0
	HEPTACHLOR EPOXIDE	12	0	0	12	0	0	11	0	0
	HEPTACHLOR	12	0	0	12	0	0	11	0	0
	MIREX	12	0	0	12	0	0	11	0	0
	OXYCHLORDANE	12	0	0	12	0	0	11	0	0
	OPDDT	12	0	0	12	0	0	11	0	0
	PCB	12	0	0	12	0	0	11	0	0
	DDD	12	0	0	12	0	0	11	0	0
	PPDDE	12	0	0	12	0	0	11	0	0
	PPDDT	12	0	0	12	0	0	11	0	0
	AMETRINE	11	0	0	11	0	0	7	0	0
	ATRAZINE	11	0	1	11	0	1	7	0	0
	ATRATONE	11	0	0	11	0	0	7	0	0
	CYANAZINE	11	0	0	11	0	0	7	0	0
	D-ETHYL ATRAZINE	11	0	0	11	0	0	7	0	0
	DES ETHYL SIMAZINE	11	0	0	11	0	0	7	0	0
	PROMETONE	11	0	0	11	0	0	7	0	0
	PROPAZINE	11	0	0	11	0	0	7	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	PROMETRYNE	11	0	0	11	0	0	7	0	0
	METRIBUZIN (SENCOR)	11	0	0	11	0	0	7	0	0
	SIMAZINE	11	0	0	11	0	0	7	0	0
	ALACHLOR	11	0	0	11	0	0	7	0	0
	METOLACHLOR	11	0	0	11	0	0	7	0	0
*TOTAL SCAN PESTICIDES & PCB		395	0	6	395	0	6	322	0	5
PHENOLICS	PHENOLICS	12	6	6	12	6	6	.	.	.
*TOTAL SCAN PHENOLICS		12	6	6	12	6	6	0	0	0
SPECIFIC PESTICIDES	TOXAPHENE	12	0	0	12	0	0	11	0	0
	2,4,5-T	2	0	0	2	0	0	.	.	.
	2,4-D	2	0	0	2	0	0	.	.	.
	2,4-DB	2	0	0	2	0	0	.	.	.
	2,4 D PROPIONIC ACID	2	0	0	2	0	0	.	.	.
	DICAMBA	2	0	0	2	0	0	.	.	.
	PICHLORAM	0	0	0	0	0	0	.	.	.
	SILVEX	2	0	0	2	0	0	.	.	.
	DIAZINON	2	0	0	2	0	0	.	.	.
	DICHLOROVOS	2	0	0	2	0	0	.	.	.
	CHLORPYRIFOS	2	0	0	2	0	0	.	.	.

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
SPECIFIC PESTICIDES	ETHION	2	0	0	2	0	0	.	.	.
	AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.
	MALATHION	2	0	0	2	0	0	.	.	.
	MEVINPHOS	2	0	0	2	0	0	.	.	.
	METHYL PARATHION	2	0	0	2	0	0	.	.	.
	METHYLTRITHION	2	0	0	2	0	0	.	.	.
	PARATHION	2	0	0	2	0	0	.	.	.
	PHORATE	2	0	0	2	0	0	.	.	.
	RELDAN	2	0	0	2	0	0	.	.	.
	RONNEL	2	0	0	2	0	0	.	.	.
	AMINOCARB	1	0	0	1	0	0	.	.	.
	BENOMYL	1	0	0	1	0	0	.	.	.
	BUX	0	0	0	0	0	0	.	.	.
	CARBOFURAN	2	0	0	2	0	0	.	.	.
	CICP	2	0	0	2	0	0	.	.	.
	DIALLATE	2	0	0	2	0	0	.	.	.
	EPTAM	1	0	0	1	0	0	.	.	.
	IPC	2	0	0	2	0	0	.	.	.
	PROPOXUR	2	0	0	2	0	0	.	.	.
	CARBARYL	2	0	0	2	0	0	.	.	.
	BUTYLATE	2	0	0	2	0	0	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES		65	0	0	65	0	0	11	0	0
VOLATILES	BENZENE	12	0	1	12	2	3	11	1	6

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	TOLUENE	12	0	1	12	3	5	11	1	8
	ETHYLBENZENE	12	0	1	12	0	5	11	0	6
	P-XYLENE	12	0	0	12	0	0	11	0	0
	M-XYLENE	12	0	0	12	2	1	11	0	4
	O-XYLENE	12	0	0	12	2	3	11	0	6
	STYRENE	12	0	2	12	0	8	11	0	8
	1,1 DICHLOROETHYLENE	12	0	0	12	0	0	11	0	0
	METHYLENE CHLORIDE	12	0	0	11	0	0	11	0	0
	T1,2DICHLOROETHYLENE	12	0	0	12	0	0	11	0	0
	1,1 DICHLOROETHANE	12	0	0	12	0	0	11	0	0
	CHLOROFORM	12	0	4	12	12	0	11	11	0
	111, TRICHLOROETHANE	12	0	2	12	0	2	11	0	3
	1,2 DICHLOROETHANE	12	0	0	12	0	0	11	0	0
	CARBON TETRACHLORIDE	12	0	0	12	0	3	11	0	2
	1,2 DICHLOROPROPANE	12	0	0	12	0	0	11	0	0
	TRICHLOROETHYLENE	12	0	0	12	0	0	11	0	0
	DICHLORODBROMOMETHANE	12	0	2	12	12	0	11	11	0
	112 TRICHLOROETHANE	12	0	0	12	0	0	11	0	0
	CHLORODIBROMOMETHANE	12	0	1	12	12	0	11	11	0
	T-CHLOROETHYLENE	12	0	0	12	0	1	11	0	2
	BROMOFORM	12	0	0	12	0	12	11	0	11
	1122 T-CHLOROETHANE	12	0	0	12	0	0	11	0	0
	CHLOROBENZENE	12	0	0	12	0	0	11	0	0
	1,4 DICHLOROBENZENE	12	0	0	12	0	0	11	0	0
	1,3 DICHLOROBENZENE	12	0	0	12	0	0	11	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WELLAND

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	1,2 DICHLOROBENZENE	12	0	0	12	0	0	11	0	0
	ETHLYENE DIBROMIDE [4]	12	0	0	12	0	0	11	0	0
	TOTL TRIHALOMETHANES	12	0	2	12	12	0	11	11	0
*TOTAL SCAN VOLATILES		348	0	16	347	57	43	319	46	56
*TOTAL GROUP ORGANIC		1171	6	28	1189	63	55	806	46	61
TOTAL		1782	450	125	1822	464	175	1946	850	248

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 ^{0}C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

INTERPRETATION OF DATA

The interpretation of analytical results that are obtained from measurements near the limit of detection of the measurement process is subject to greater uncertainty than those at higher concentrations. The principle areas of concern relate to whether the substance has actually been detected, whether it has been properly identified, and whether it is an artifact of the measurement process. In other words, false positives can be caused by the instrumentation or the test procedures used, when in fact these compounds are not present in the sample.

There are several methods to treat data from such measurements:
1. Exclude the low-level data because of this uncertainty factor. Studies of long-term environmental trends and modelling may however, be adversely affected by the exclusion of such data.
2. Qualify these data so the user is aware of the greater uncertainty associated with their use.

For the Drinking Water Surveillance Program, measurements near the limit of detection of the measurement process are reported with the code "<T". Results qualified by "W" indicate a zero measurement. These results are reported for purposes of modelling and long-term trend analysis and no significance should be attributed to a single determination of a substance below "T" (a single determination may well be a false positive). Repeat analysis or additional data are needed before it can be stated with certainty that the substance in question was truly present. On the other hand, it is less likely that repeated detection of a substance at or near the limit of detection at a specific location is solely due to an artifact in the measurement system, and more likely represents a true positive. The average of such data however, is still only an estimate of the amount of substance present subject to the possible biases of the method used.

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!IV	No Data: Inverted Septum
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded

!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!RE	No Data: Received Empty
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
USD	Unreliable: Sample Decomposition Noted
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours
T# (T06)	Result Taken After # Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		
			STANDING	FREE FLOW	
BACTERIOLOGICAL					
FECAL COLIFORM MF (CT/100ML)			**DET'N LIMIT = 0**		**GUIDELINE = 0 (A1)**
JAN	32 T24	.	.	.	
FEB	BDL	.	.	.	
MAR	4 T48	.	.	.	
APR	2 <=>	.	.	.	
MAY	BDL	.	.	.	
JUN	6	.	.	.	
JUL	ILA	.	.	.	
AUG	2	.	.	.	
SEP	7	.	.	.	
OCT	3	.	.	.	
NOV	2	.	.	.	
DEC	4	.	.	.	
STANDRD PLATE CNT MF ( )			**DET'N LIMIT = 0**		**GUIDELINE = 500/ML (A1)**
JAN	.	0 <=>	.	1 <=>	
FEB	.	0 <=>	.	0 <=>	
MAR	.	1 <=>	.	220 T24	
APR	.	.	.	7 <=>	
MAY	.	1 <=>	.	2 <=>	
JUN	.	6 <=>	.	27	
JUL	.	68	.	2 <=>	
AUG	.	2400 >	.	44	
SEP	.	130	.	14	
OCT	.	0 <=>	.	2 <=>	
NOV	.	4 <=>	.	1 <=>	
DEC	.	2 <=>	.	0 <=>	
TOTAL COLIFORM MF (CT/100ML)			**DET'N LIMIT = 0**		**GUIDELINE = 5/100ML(A1)**
JAN	2700 A3C	0 T24	.	0 T24	
FEB	20 <=>	0 T48	.	0 T24	
MAR	380 A3C	0 T48	.	0 T24	
APR	640 A3C	.	.	0 T48	
MAY	340	0	.	0	
JUN	210 A3C	0	.	0	
JUL	300 <=>	0	.	0	
AUG	10 <=>	0	.	0	
SEP	44 A3C	0	.	0	
OCT	100 A3C	0	.	0	
NOV	200	0	.	0	
DEC	380 A3C	0	.	0	
T COLIFORM BCKGRD MF (CT/100ML)			**DET'N LIMIT = 0**		**GUIDELINE = N/A**
JAN	16000 A3C	0 T24	.	1 T24	
FEB	1280 T48	0 T48	.	0 T24	
MAR	29200 A3C	0 T48	.	0 T24	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
APR	11800 A3C	.	.	0 T48
MAY	780	0	.	0
JUN	24000 >	0	.	0
JUL	35000 A3C	0	.	0
AUG	8300 A3C	0	.	0
SEP	9600 >	0	.	0
OCT	2320 A3C	0	.	0
NOV	2800	0	.	0
DEC	6400 A3C	0	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		
			STANDING	FREE FLOW	
CHEMISTRY (FLD)					
FLD CHLORINE (COMB) ( )			DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	.150	.	.150	
FEB	.	.130	.150	.150	
MAR	.	.100	.100	.150	
APR	.	.100	.100	.100	
MAY	.	.100	.100	.150	
JUN	.	.450	.050	.100	
JUL	.	.190	.100	.050	
AUG	.	.200	.100	.100	
SEP	.	.400	.100	.150	
OCT	.	.190	.000	.050	
NOV	.	.100	.100	.150	
DEC	.	.250	.150	.100	
FLD CHLORINE FREE ( )			DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	.350	.	.350	
FEB	.	.350	.150	.300	
MAR	.	.400	.150	.350	
APR	.	.350	.200	.350	
MAY	.	.400	.150	.350	
JUN	.	.300	.150	.300	
JUL	.	.330	.200	.300	
AUG	.	.300	.100	.350	
SEP	.	.300	.100	.250	
OCT	.	.230	.100	.300	
NOV	.	.450	.150	.350	
DEC	.	.350	.150	.350	
FLD CHLORINE (TOTAL) ( )			DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	.500	.	.500	
FEB	.	.480	.300	.450	
MAR	.	.500	.250	.500	
APR	.	.450	.300	.450	
MAY	.	.500	.250	.500	
JUN	.	.750	.200	.400	
JUL	.	.520	.300	.350	
AUG	.	.500	.200	.450	
SEP	.	.700	.200	.400	
OCT	.	.420	.100	.350	
NOV	.	.550	.250	.500	
DEC	.	.600	.300	.450	
FLD PH (DMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
JAN	7.700	7.300	.	7.300	
FEB	7.700	7.300	7.400	7.400	
MAR	7.700	7.400	7.400	7.500	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
APR	7.800	7.400	7.600	7.500
MAY	8.000	7.600	7.400	7.450
JUN	7.900	7.400	7.500	7.500
JUL	7.800	7.200	7.300	7.500
AUG	7.800	7.500	7.400	7.600
SEP	7.700	7.400	7.500	7.500
OCT	7.900	7.500	7.500	7.500
NOV	7.900	7.500	7.600	7.300
DEC	7.700	7.500	7.250	7.300
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A	GUIDELINE = 15 (A1)
JAN	.500	.500	.	3.000
FEB	1.200	1.200	2.500	2.500
MAR	2.000	1.000	6.000	2.000
APR	5.000	4.500	9.000	4.800
MAY	8.500	8.500	12.000	8.500
JUN	16.000	16.000	17.000	15.500
JUL	20.000	19.500	20.000	20.000
AUG	22.000	22.000	22.000	22.000
SEP	21.000	21.000	21.500	21.500
OCT	14.200	14.300	17.500	15.500
NOV	10.500	11.000	15.000	11.600
DEC	25.000	25.000	11.500	4.500
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)
JAN	8.200	.400	.	.420
FEB	6.000	.240	.300	.170
MAR	2.000	.200	.330	.320
APR	5.400	.280	.370	.280
MAY	2.500	.290	.310	.280
JUN	4.200	.330	.550	.330
JUL	3.700	.190	.380	.330
AUG	2.400	.230	.280	.250
SEP	2.400	.700	.270	.240
OCT	4.300	.270	.310	.290
NOV	4.000	.250	.570	.420
DEC	14.000	.250	.390	.350

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		
			STANDING	FREE FLOW	
CHEMISTRY (LAB)					
ALKALINITY (MG/L)			DET'N LIMIT = .200		GUIDELINE = 30-500 (A4)
JAN	108.100	99.400	.	99.700	
FEB	107.500	99.700	99.200	99.300	
MAR	105.000	99.100	98.600	98.000	
APR	101.400	97.200	94.500	94.600	
MAY	106.500	100.900	98.900	99.300	
JUN	105.000	IIS	96.700	97.200	
JUL	100.500	93.900	93.600	90.500	
AUG	101.300	96.500	94.900	96.100	
SEP	100.700	92.000	92.500	92.700	
OCT	103.200	95.900	96.600	96.100	
NOV	104.000	97.100	97.400	96.500	
DEC	105.900	97.600	98.700	97.800	
CALCIUM (MG/L)			DET'N LIMIT = .100		GUIDELINE = 100 (F2)
JAN	41.200	40.800	.	41.000	
FEB	39.000	39.600	38.200	37.800	
MAR	38.400	38.600	39.200	39.000	
APR	38.400	38.600	38.600	39.200	
MAY	41.000	41.000	41.400	40.800	
JUN	40.200	IIS	40.400	41.000	
JUL	39.400	38.600	38.800	39.000	
AUG	36.000	35.600	36.800	36.600	
SEP	37.200	36.400	38.200	37.600	
OCT	36.400	37.000	36.800	37.000	
NOV	36.800	37.000	37.000	36.200	
DEC	43.000	42.800	43.000	42.400	
CHLORIDE (MG/L)			DET'N LIMIT = .200		GUIDELINE = 250 (A3)
JAN	19.000	19.500	.	19.600	
FEB	17.800	18.800	18.800	18.700	
MAR	17.000	17.900	18.600	18.600	
APR	16.800	18.100	18.000	18.000	
MAY	16.400	17.700	15.700	17.900	
JUN	16.100	17.600	17.600	13.500	
JUL	16.100	17.600	17.500	17.400	
AUG	15.300	16.400	16.900	17.000	
SEP	15.100	16.700	16.700	16.600	
OCT	14.900	15.800	16.000	15.900	
NOV	15.100	16.500	16.400	16.200	
DEC	15.900	17.000	17.100	17.000	
COLOUR (HZU)			DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)
JAN	2.000 <T	1.000 <T	.	1.000 <T	
FEB	2.500	1.000 <T	1.000 <T	1.500 <T	
MAR	2.500	.500 <T	.500 <T	.500 <T	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
APR	3.000	1.000 <T	2.000 <T	1.500 <T
MAY	2.500	1.000 <T	1.500 <T	1.000 <T
JUN	3.500	BDL	1.500 <T	1.000 <T
JUL	2.500	1.500 <T	1.000 <T	1.000 <T
AUG	2.500	1.000 <T	1.000 <T	.500 <T
SEP	2.000 <T	1.000 <T	1.000 <T	1.000 <T
OCT	2.000 <T	.500 <T	1.000 <T	.500 <T
NOV	1.500 <T	.500 <T	1.000 <T	.500 <T
DEC	.500 <T	.500 <T	1.000 <T	.500 <T
CONDUCTIVITY (UMHO/CM)			DET'N LIMIT = 1	GUIDELINE = 400 (F2)
JAN	326	326	.	326
FEB	321	326	325	324
MAR	311	314	317	317
APR	317	320	322	323
MAY	319	320	322	321
JUN	310	118	315	316
JUL	299	303	304	304
AUG	291	295	294	294
SEP	291	294	295	295
OCT	299	302	304	303
NOV	300	304	305	303
DEC	310	316	317	313
FLUORIDE (MG/L)			DET'N LIMIT = .01	GUIDELINE = 2.400 (A1)
JAN	.160	1.100	.	1.100
FEB	.120	1.060	1.080	1.040
MAR	.120	.960	1.100	1.080
APR	1.120	1.060	1.120	1.100
MAY	.140	.660 RRV	1.020	1.120
JUN	.140	.	1.180	1.220
JUL	.120	.940	1.140	1.480
AUG	.100	.120	.500	.180
SEP	.120	1.360	1.200	1.260
OCT	.120	1.180	1.180	1.200
NOV	.120	1.060	1.200	1.260
DEC	.120	1.060	1.080	1.060
HARDNESS (MG/L)			DET'N LIMIT = .500	GUIDELINE = 80-100 (A4)
JAN	141.000	140.000	.	140.000
FEB	136.000	137.000	135.000	133.000
MAR	131.000	132.000	132.000	132.000
APR	132.000	134.000	133.000	135.000
MAY	141.000	143.000	143.000	141.000
JUN	139.000	118	139.000	142.000
JUL	135.000	133.000	133.000	134.000
AUG	124.000	124.000	126.000	127.000

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		
			STANDING	FREE FLOW	
SEP	128.000	126.000	131.000	129.000	
OCT	127.000	128.000	128.000	128.000	
NOV	128.000	129.000	129.000	127.000	
DEC	145.000	144.000	145.000	143.000	
IONCAL (DIMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	2.161	.585	.	.408	
FEB	.522	.952	2.441	3.161	
MAR	2.411	.501	.262	.150	
APR	2.513	1.758	3.484	4.105	
MAY	3.258	4.794	8.363	4.734	
JUN	2.518	.000 MAF	3.861	9.458	
JUL	4.343	3.950	3.804	6.373	
AUG	2.573	2.758	.785	.922	
SEP	.901	.791	2.158	1.206	
OCT	2.530	.111	.771	.311	
NOV	2.984	1.668	1.474	2.330	
DEC	3.861	4.412	3.918	3.780	
LANGELIERS INDEX (DIMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.475	.454	.	.458	
FEB	.449	.243	.205	.211	
MAR	.433	.180	.204	.149	
APR	.397	.261	.289	.316	
MAY	.607	.603	.539	.634	
JUN	.473	.	.309	.248	
JUL	.249	.039	.020	-.073	
AUG	.286	.199	.386	.189	
SEP	.428	.308	.291	.275	
OCT	.506	.390	.390	.351	
NOV	.434	.365	.214	.283	
DEC	.556	.428	.445	.545	
MAGNESIUM (MG/L)			DET'N LIMIT = .050		GUIDELINE = 30 (F2)
JAN	9.200	9.200	.	9.200	
FEB	9.600	9.300	9.600	9.400	
MAR	8.500	8.500	8.400	8.400	
APR	8.800	9.000	8.900	9.000	
MAY	9.500	9.800	9.700	9.600	
JUN	9.500	11S	9.300	9.600	
JUL	8.800	8.900	8.800	8.800	
AUG	8.400	8.500	8.300	8.700	
SEP	8.600	8.600	8.600	8.600	
OCT	8.800	8.700	8.700	8.700	
NOV	8.900	8.900	8.900	8.900	
DEC	9.100	9.000	9.000	9.000	

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		
			STANDING	FREE FLOW	
SODIUM (MG/L)			DET'N LIMIT = .200		GUIDELINE = 200 (C3)
JAN	11.000	10.800	.	10.800	
FEB	11.000	11.000	10.600	11.200	
MAR	9.800	10.000	10.400	10.200	
APR	12.400	11.800	12.000	11.800	
MAY	9.800	10.000	9.800	10.200	
JUN	9.400	IIS	9.800	9.800	
JUL	10.000	10.000	9.800	9.800	
AUG	8.800	9.000	9.200	8.800	
SEP	9.000	8.800	9.000	9.000	
OCT	9.200	9.200	9.400	9.200	
NOV	9.400	9.600	9.400	9.300	
DEC	8.800	8.800	8.800	8.400	
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)
JAN	.032	.012	.	.012	
FEB	.012	.008 <T	.002 <T	.008 <T	
MAR	.016	BDL	BDL	BDL	
APR	.024	.002 <T	BDL	.008 <T	
MAY	.044	.002 <T	.004 <T	BDL	
JUN	.050	BDL	BDL	BDL	
JUL	.034	BDL	.004 <T	.002 <T	
AUG	.022	.002 <T	.006 <T	.002 <T	
SEP	.024	BDL	BDL	BDL	
OCT	.016	.002	.002	.002	
NOV	.014	BDL	BDL	BDL	
DEC	.012	BDL	BDL	BDL	
NITRITE (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)
JAN	.012	.004 <T	.	.004 <T	
FEB	.012	.003 <T	.004 <T	.004 <T	
MAR	.007	.004 <T	.004 <T	.003 <T	
APR	.008	.001 <T	.001 <T	.002 <T	
MAY	.015	.003 <T	.004 <T	.004 <T	
JUN	.008	.003 <T	.004 <T	.004 <T	
JUL	.003 <T	BDL	.001 <T	BDL	
AUG	.006	.001 <T	.001 <T	BDL	
SEP	.007	.005	.004 <T	.003 <T	
OCT	.005	BDL	.002 <T	.001 <T	
NOV	.013	.002 <T	.002 <T	.002 <T	
DEC	.009	.001 <T	.001 <T	BDL	
TOTAL NITRATES (MG/L)			DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)
JAN	.270	.250	.	.250	
FEB	.350	.350	.340	.340	
MAR	.200	.190	.205	.200	
APR	.190	.175	.190	.195	

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
MAY	.340	.290	.300	.275
JUN	.035	BDL	.020 <T	.025
JUL	.140	.140	.145	.140
AUG	.105	.105	.110	.105
SEP	.080	.075	.065	.060
OCT	.130	.130	.130	.130
NOV	.150	.125	.125	.135
DEC	.345	.365	.345	.340
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = .020	GUIDELINE = N/A
JAN	.260	.190	.	.190
FEB	.270	.160	.180	.160
MAR	.260	.210	.210	.200
APR	.300	.200	.210	.200
MAY	.320	.230	.260	.290
JUN	.320	11S	.180	.190
JUL	.270	.180	.180	.190
AUG	.280	.190	.200	.190
SEP	.280	.180	.190	.210
OCT	.220	.150	.160	.160
NOV	.220	.170	.160	.140
DEC	.300	.240	.220	.200
PH (DMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)
JAN	8.270	8.290	.	8.290
FEB	8.270	8.090	8.070	8.080
MAR	8.270	8.040	8.060	8.010
APR	8.250	8.130	8.170	8.190
MAY	8.410	8.430	8.370	8.470
JUN	8.290	11S	8.160	8.090
JUL	8.090	7.920	7.900	7.820
AUG	8.160	8.100	8.280	8.080
SEP	8.290	8.220	8.180	8.170
OCT	8.370	8.280	8.280	8.240
NOV	8.290	8.250	8.100	8.180
DEC	8.340	8.250	8.260	8.370
PHOSPHORUS FIL REACT (MG/L)			DET'N LIMIT = .0005	GUIDELINE = N/A
JAN	.002	.000 <T	.	.
FEB	.001 <T	.004	.	.
MAR	.001 <T	BDL	.	.
APR	.000 <T	.004	.	.
MAY	.001 <T	BDL	.	.
JUN	.000 <T	BDL	.	.
JUL	BDL	.002 <T	.	.
AUG	.001 <T	BDL	.	.
SEP	.002 <T	.005	.	.

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
OCT	.001 <T	.007	.	.
NOV	.002	.001 <T	.	.
DEC	.002	BDL	.	.
PHOSPHORUS TOTAL (MG/L)			DET'N LIMIT = .002	GUIDELINE = .40 (F2)
JAN	.018	.011	.	.
FEB	.017	.009 <T	.	.
MAR	.010	.008 <T	.	.
APR	.015	.010	.	.
MAY	.012	.007 <T	.	.
JUN	.022	11S	.	.
JUL	.014	.010	.	.
AUG	.015	.006 <T	.	.
SEP	.013	.009 <T	.	.
OCT	.008 <T	.007 <T	.	.
NOV	.008 <T	BDL	.	.
DEC	.020	.005 <T	.	.
SULPHATE (MG/L)			DET'N LIMIT = .200	GUIDELINE = 500. (A3)
JAN	31.110	34.900	.	34.680
FEB	25.870	33.730	33.450	34.090
MAR	25.100	27.670	27.900	27.770
APR	28.240	31.630	31.810	32.200
MAY	25.780	28.730	28.520	29.300
JUN	27.130	11S	31.540	31.420
JUL	25.160	28.450	28.750	28.880
AUG	23.110	26.270	26.900	26.110
SEP	25.840	29.460	29.600	29.470
OCT	25.080	28.150	28.400	28.430
NOV	26.450	30.250	29.420	29.560
DEC	27.130	31.880	31.930	30.930
TURBIDITY (FTU)			DET'N LIMIT = .02	GUIDELINE = 1.00 (A1)
JAN	8.700	.280	.	.290
FEB	7.400	.420	.700	.310
MAR	3.200	.450	.790	.920
APR	6.400	.260	.260	.240 <T
MAY	3.100	.480	.280	.510
JUN	.280	11S	.330	.520
JUL	3.600	.190 <T	.270	.390
AUG	2.300	.370	.400	.330
SEP	.900	.200 <T	.150 <T	.250 <T
OCT	5.500	.290	.280	.190 <T
NOV	5.300	.320	.560	.520
DEC	12.000	.380	.370	.280

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
METALS				
SILVER (UG/L)				DET'N LIMIT = .020 GUIDELINE = 50. (A1)
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.030 <T	.030 <T
MAR	BDL	BDL	BDL	BDL
APR	.100 <T	.040 <T	.100 <T	.120 <T
MAY	BDL	BDL	BDL	.080 <T
JUN	BDL	BDL	.030 <T	BDL
JUL	BDL	BDL	BDL	BDL
AUG	.070 <T	.030 <T	.070 <T	.030 <T
SEP	.030 <T	.040 <T	BDL	.030 <T
OCT	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL
ALUMINUM (UG/L)				DET'N LIMIT = .050 GUIDELINE = 100.(A4)
JAN	87.000	56.840	.	58.000
FEB	162.400	52.200	48.720	42.920
MAR	42.920	73.080	58.000	66.120
APR	22.040	83.520	68.440	75.400
MAY	53.360	150.800	116.000	127.600
JUN	81.000	230.000	170.000	220.000
JUL	50.000	250.000	170.000	270.000
AUG	52.000	310.000	250.000	300.000
SEP	29.000	220.000	150.000	190.000
OCT	70.000	150.000	120.000	140.000
NOV	37.000	120.000	98.000	100.000
DEC	130.000	64.000	60.000	61.000
ARSENIC (UG/L)				DET'N LIMIT = 0.050 GUIDELINE = 50.0 (A1)
JAN	1.000 <T	.720 <T	.	.880 <T
FEB	.740 <T	.680 <T	.910 <T	.680 <T
MAR	1.100	1.100	1.100	1.100
APR	.890 <T	1.300	1.200	1.200
MAY	.910 <T	1.200	1.400	1.500
JUN	1.500	1.200	1.400	1.300
JUL	1.300	1.600	1.400	1.600
AUG	1.300	1.200	1.100	.930 <T
SEP	1.500	1.900	1.600	1.700
OCT	.600 <T	.750 <T	.660 <T	.660 <T
NOV	.630 <T	.780 <T	.750 <T	.920 <T
DEC	.640 <T	.490 <T	.660 <T	.730 <T
BARIUM (UG/L)				DET'N LIMIT = 0.020 GUIDELINE = 1000. (A1)
JAN	24.000	22.000	.	22.000
FEB	24.000	21.000	22.000	21.000
MAR	23.000	22.000	20.000	21.000

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
APR	23.000	21.000	23.000	22.000
MAY	22.000	22.000	22.000	22.000
JUN	23.000	23.000	22.000	23.000
JUL	23.000	23.000	22.000	22.000
AUG	25.000	24.000	24.000	23.000
SEP	22.000	21.000	22.000	22.000
OCT	21.000	20.000	21.000	21.000
NOV	20.000	20.000	20.000	20.000
DEC	23.000	22.000	22.000	21.000
BORON (UG/L)			DET'N LIMIT = 0.200 GUIDELINE = 5000. (A1)	
JAN	25.000	24.000	.	27.000
FEB	26.000	75.000	64.000	49.000
MAR	26.000	89.000	86.000	91.000
APR	130.000	110.000	160.000	190.000
MAY	160.000	230.000	240.000	200.000
JUN	24.000	25.000	34.000	30.000
JUL	31.000	42.000	38.000	41.000
AUG	52.000	54.000	54.000	33.000
SEP	37.000	33.000	46.000	39.000
OCT	23.000	22.000	22.000	22.000
NOV	23.000	23.000	22.000	23.000
DEC	22.000	22.000	26.000	28.000
BERYLLIUM (UG/L)			DET'N LIMIT = 0.010 GUIDELINE = N/A	
JAN	BDL	.040 <T	.	BDL
FEB	BDL	.050 <T	.050 <T	.100 <T
MAR	BDL	.100 <T	.120 <T	.080 <T
APR	.070 <T	.080 <T	.080 <T	.070 <T
MAY	.070 <T	.450 <T	.470 <T	.170 <T
JUN	BDL	BDL	.040 <T	.020 <T
JUL	.070 <T	.110 <T	BDL	.060 <T
AUG	.120 <T	.060 <T	.050 <T	BDL
SEP	.030 <T	.020 <T	.110 <T	.020 <T
OCT	BDL	BDL	BDL	BDL
NOV	.020 <T	.020 <T	BDL	.020 <T
DEC	BDL	BDL	BDL	.060 <T
CADMIUM (UG/L)			DET'N LIMIT = 0.050 GUIDELINE = 5.000 (A1)	
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.060 <T	BDL
MAR	BDL	BDL	BDL	BDL
APR	.240 <T	.100 <T	.160 <T	.170 <T
MAY	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL

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DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
SEP	BDL	BDL	BDL	BDL
OCT	BDL	BDL	.100 <T	BDL
NOV	BDL	BDL	.080 <T	BDL
DEC	BDL	BDL	BDL	BDL
COBALT (UG/L)				DET'N LIMIT = 0.020 GUIDELINE = N/A
JAN	.250 <T	.150 <T	.	.140 <T
FEB	.080 <T	.090 <T	.030 <T	.040 <T
MAR	.090 <T	.050 <T	.070 <T	.050 <T
APR	BDL	.140 <T	.070 <T	.090 <T
MAY	.240 <T	.180 <T	.130 <T	.130 <T
JUN	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL
AUG	.150 <T	.080 <T	.110 <T	.080 <T
SEP	.100 <T	BDL	BDL	BDL
OCT	.120 <T	.060 <T	.060 <T	.040 <T
NOV	.110 <T	.030 <T	.100 <T	.190 <T
DEC	.200 <T	.090 <T	.080 <T	.160 <T
CHROMIUM (UG/L)				DET'N LIMIT = 0.100 GUIDELINE = 50. (A1)
JAN	.160 <T	.350 <T	.	.810 <T
FEB	.410 <T	6.800	5.000	3.500
MAR	.950 <T	10.000	9.700	10.000
APR	4.200	4.400	5.700	6.700
MAY	5.400	8.100	8.400	7.300
JUN	.370 <T	.320 <T	3.900	2.400
JUL	2.200	4.800	4.600	5.000
AUG	5.200	5.400	5.500	1.800
SEP	2.200	1.700	4.400	2.900
OCT	.770 <T	.390 <T	.290 <T	.240 <T
NOV	.270 <T	.300 <T	.330 <T	.530 <T
DEC	BDL	BDL	1.500 <T	2.000 <T
COPPER (UG/L)				DET'N LIMIT = .100 GUIDELINE = 1000 (A3)
JAN	1.300	1.400	.	3.800
FEB	1.700	1.600	63.000	2.900
MAR	2.300	1.700	69.000	3.300
APR	1.400	1.600	52.000	3.300
MAY	1.800	2.700	74.000	3.100
JUN	1.600	1.300	46.000	2.800
JUL	1.600	1.100	55.000	3.200
AUG	1.200	.870 <T	32.000	3.200
SEP	1.400	.970 <T	42.000	2.900
OCT	1.000 <T	.880 <T	59.000	2.700
NOV	1.200	.870 <T	58.000	3.300
DEC	1.300 <T	.990 <T	63.000	2.500 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
IRON (UG/L)				DET'N LIMIT = 4.000 GUIDELINE = 300. (A3)
JAN	120.000	32.000 <T	.	25.000 <T
FEB	130.000	BDL	8.300 <T	BDL
MAR	44.000 <T	BDL	BDL	5.100 <T
APR	7.500 <T	7.500 <T	BDL	BDL
MAY	49.000 <T	21.000 <T	7.300 <T	BDL
JUN	92.000	6.000 <T	BDL	BDL
JUL	76.000	BDL	10.000 <T	6.300 <T
AUG	61.000	BDL	BDL	7.100 <T
SEP	40.000 <T	BDL	BDL	BDL
OCT	100.000	5.800 <T	BDL	BDL
NOV	67.000	BDL	11.000 <T	5.900 <T
DEC	190.000	BDL	9.600 <T	BDL
MERCURY (UG/L)				DET'N LIMIT = 0.010 GUIDELINE = 1.000 (A1)
JAN	BDL	BDL	.	BDL
FEB	BDL	.060	.	BDL
MAR	BDL	.020 <T	.	.030 <T
APR	BDL	BDL	.	BDL
MAY	.020 <T	.020 <T	.	BDL
JUN	.020 <T	.030 <T	.	BDL
JUL	BDL	BDL	.	BDL
AUG	.030 <T	.060	.	.030 <T
SEP	.050 <T	.050 <T	.	BDL
OCT	.070	.080	.	BDL
NOV	.040 <T	.070	.	BDL
DEC	.130	.360	.	BDL
MANGANESE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 50.0 (A3)
JAN	6.400	.720	.	.950
FEB	5.000	.630	1.100	.650
MAR	4.000	.750	1.100	1.000
APR	.200 <T	1.100	1.300	1.100
MAY	4.600	1.100	1.500	.800
JUN	8.100	1.200	1.800	1.500
JUL	5.300	.810	1.800	1.300
AUG	4.800	.690	1.300	.920
SEP	5.600	.680	1.500	.920
OCT	5.900	1.100	1.500	.990
NOV	5.200	.610	1.300	.800
DEC	8.000	.520	1.100	.720
MOLYBDENUM (UG/L)				DET'N LIMIT = 0.020 GUIDELINE = N/A
JAN	1.100	1.300	.	1.200
FEB	1.100	1.200	1.200	1.400
MAR	1.400	1.400	1.400	1.300
APR	1.400	1.300	1.100	1.200

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
MAY	1.500	1.400	1.600	1.500
JUN	1.500	1.700	1.500	1.700
JUL	1.300	1.400	1.300	1.300
AUG	1.300	1.300	1.400	1.400
SEP	1.500	1.600	1.500	1.400
OCT	1.300	1.100	1.200	1.100
NOV	1.100	1.200	1.200	1.200
DEC	.940	1.300	1.200	1.200
NICKEL (UG/L)				DET'N LIMIT = 0.100 GUIDELINE = 50. (F3)
JAN	1.900 <T	1.800 <T	.	1.800 <T
FEB	.770 <T	1.300 <T	.460 <T	BDL
MAR	.780 <T	.790 <T	3.400	.750 <T
APR	1.200 <T	1.200 <T	2.400	1.200 <T
MAY	1.900 <T	1.900 <T	3.000	2.200
JUN	.670 <T	.110 <T	.790 <T	BDL
JUL	BDL	BDL	3.400	BDL
AUG	1.300 <T	1.200 <T	2.400	1.200 <T
SEP	2.600	1.100 <T	2.200	.970 <T
OCT	1.100 <T	.960 <T	1.300 <T	.670 <T
NOV	2.500	1.900 <T	3.000	2.100
DEC	1.900 <T	1.700 <T	2.200	1.900 <T
LEAD (UG/L)				DET'N LIMIT = 0.050 GUIDELINE = 50. (A1)
JAN	.260	.130 <T	.	2.000
FEB	.230	.090 <T	10.000	.730
MAR	.600	.050 <T	8.600	1.300
APR	BDL	.420	9.700	1.600
MAY	.300	.980	11.000	2.000
JUN	.440	.270	11.000	2.300
JUL	.210	BDL	13.000	2.600
AUG	.330	.090 <T	13.000	3.100
SEP	.350	.080 <T	14.000	3.300
OCT	.130 <T	.030 <T	14.000	2.800
NOV	.140 <T	.040 <T	11.000	2.100
DEC	.290 <T	BDL	11.000	1.600
ANTIMONY (UG/L)				DET'N LIMIT = .050 GUIDELINE = 146. (D4)
JAN	.460	.460	.	.540
FEB	.410	.420	.590	.500
MAR	.670	.600	.630	.680
APR	.530	.650	.660	.560
MAY	.870	.940	.890	.890
JUN	.830	.980	.940	.960
JUL	.730	.710	.620	.820
AUG	.680	.660	.620	.620
SEP	.770	.730	.700	.760

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
OCT	.480	.560	.550	.420
NOV	.400	.340	.410	.600
DEC	.450 <T	.610	.630	.530
SELENIUM (UG/L)				DET'N LIMIT = 0.200 GUIDELINE = 10. (A1)
JAN	BDL	2.000 <T	.	1.500 <T
FEB	.330 <T	1.200 <T	1.900 <T	1.500 <T
MAR	3.600 <T	6.200 <T	6.600 <T	5.300 <T
APR	1.900 <T	2.900 <T	2.800 <T	2.100 <T
MAY	3.100 <T	5.500 <T	6.000 <T	3.600 <T
JUN	.340 <T	2.300 <T	4.300 <T	3.900 <T
JUL	1.800 <T	2.400 <T	3.800 <T	4.500 <T
AUG	BDL	3.500 <T	2.100 <T	3.600 <T
SEP	BDL	3.400 <T	4.800 <T	3.800 <T
OCT	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL
STRONTIUM (UG/L)				DET'N LIMIT = .050 GUIDELINE = N/A
JAN	180.000	180.000	.	190.000
FEB	180.000	180.000	190.000	180.000
MAR	180.000	180.000	190.000	190.000
APR	210.000	190.000	210.000	210.000
MAY	200.000	200.000	210.000	190.000
JUN	220.000	210.000	210.000	220.000
JUL	190.000	180.000	180.000	190.000
AUG	180.000	180.000	180.000	180.000
SEP	170.000	170.000	170.000	170.000
OCT	170.000	170.000	170.000	170.000
NOV	170.000	160.000	160.000	160.000
DEC	180.000	180.000	180.000	180.000
TITANIUM (UG/L)				DET'N LIMIT = .050 GUIDELINE = N/A
JAN	5.600	3.600	.	3.800
FEB	11.000	4.300	4.400	2.300
MAR	6.700	5.700	6.000	6.000
APR	7.000	6.500	8.300	9.100
MAY	7.100	5.400	7.600	6.700
JUN	9.400	8.000	7.800	8.200
JUL	5.800	5.200	7.100	7.500
AUG	5.500	3.600	4.700	4.800
SEP	5.700	5.500	6.800	6.500
OCT	5.400	3.900	3.700	3.900
NOV	3.900	3.700	3.800	3.600
DEC	7.600	3.900 <T	4.800 <T	4.700 <T
THALLIUM (UG/L)				DET'N LIMIT = .010 GUIDELINE = 13. (D4)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.060 <T	BDL
MAR	BDL	.050 <T	.070 <T	.020 <T
APR	.150 <T	BDL	.250	.150 <T
MAY	BDL	BDL	.030 <T	.060 <T
JUN	BDL	BDL	BDL	BDL
JUL	.060 <T	.040 <T	.030 <T	BDL
AUG	BDL	BDL	BDL	BDL
SEP	.060 <T	.040 <T	.100 <T	.090 <T
OCT	BDL	BDL	BDL	BDL
NOV	.030 <T	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL
URANIUM (UG/L)			DET'N LIMIT = .020	GUIDELINE = 100.(B1)
JAN	.400	.320	.	.330
FEB	.370	.320	.330	.390
MAR	.460	.570	.540	.530
APR	.590	.430	.400	.490
MAY	.480	.510	.410	.460
JUN	.530	.570	.520	.620
JUL	.660	.660	.500	.570
AUG	.590	.540	.520	.590
SEP	.430	.430	.340	.390
OCT	.310	.240	.180 <T	.280
NOV	.230	.250	.270	.260
DEC	.350 <T	.330 <T	.270 <T	.300 <T
VANADIUM (UG/L)			DET'N LIMIT = .050	GUIDELINE = N/A
JAN	.400 <T	.600	.	.580
FEB	.440 <T	.530	.430 <T	.430 <T
MAR	.190 <T	.370 <T	.400 <T	.380 <T
APR	.190 <T	.430 <T	.390 <T	.480 <T
MAY	.360 <T	.550	.570	.570
JUN	.430 <T	.690	.690	.660
JUL	.280 <T	.470 <T	.520	.510
AUG	.340 <T	.530	.500 <T	.460 <T
SEP	.390 <T	.610	.600	.600
OCT	.290 <T	.390 <T	.440 <T	.390 <T
NOV	.240 <T	.370 <T	.390 <T	.380 <T
DEC	.490 <T	.510	.480 <T	.520
ZINC (UG/L)			DET'N LIMIT = .001	GUIDELINE = 5000. (A3)
JAN	2.600	1.400	.	3.300
FEB	1.800	1.200	54.000	3.100
MAR	2.500	1.500	52.000	4.000
APR	1.300	1.900	56.000	4.600
MAY	2.200	21.000	60.000	9.800

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JUN	3.100	2.200	46.000	6.200
JUL	2.800	2.200	58.000	7.700
AUG	1.100	.980 <T	42.000	4.900
SEP	2.100	1.700	56.000	8.000
OCT	1.300	1.500	65.000	7.700
NOV	2.100	1.800	60.000	8.500
DEC	2.000 <T	.980 <T	72.000	5.400

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		
			STANDING	FREE FLOW	
PESTICIDES & PCB					
ALPHA BHC (NG/L)			**DET'N LIMIT = 1.000**		**GUIDELINE = 700 (G)**
JAN	BDL	BDL	.	BDL	
FEB	1.000 <T	BDL	.	ILA	
MAR	2.000 <T	2.000 <T	.	1.000 <T	
APR	BDL	BDL	.	2.000 <T	
MAY	BDL	BDL	.	BDL	
JUN	BDL	2.000 <T	.	BDL	
JUL	2.000 <T	2.000 <T	.	2.000 <T	
AUG	2.000 <T	BDL	.	BDL	
SEP	BDL	BDL	.	1.000 <T	
OCT	BDL	BDL	.	BDL	
NOV	BDL	BDL	.	BDL	
DEC	1.000 <T	1.000 <T	.	1.000 <T	
LINDANE (NG/L)			**DET'N LIMIT = 1.000**		**GUIDELINE = 4000 (A1)**
JAN	BDL	BDL	.	BDL	
FEB	BDL	BDL	.	ILA	
MAR	BDL	BDL	.	BDL	
APR	BDL	BDL	.	BDL	
MAY	BDL	BDL	.	BDL	
JUN	BDL	BDL	.	BDL	
JUL	BDL	BDL	.	BDL	
AUG	BDL	BDL	.	BDL	
SEP	BDL	5.000 <T	.	BDL	
OCT	BDL	BDL	.	BDL	
NOV	BDL	BDL	.	BDL	
DEC	BDL	BDL	.	BDL	
ATRAZINE (NG/L)			**DET'N LIMIT = 50.00**		**GUIDELINE = 60000 (B3)**
JAN	BDL	BDL	.	BDL	
FEB	BDL	BDL	.	BDL	
MAR	BDL	BDL	.	BDL	
APR	BDL	BDL	.	BDL	
MAY	BDL	BDL	.	BDL	
JUN	BDL	BDL	.	BDL	
JUL	BDL	BDL	.	BDL	
AUG	90.000 <T	90.000 <T	.	.	
SEP	BDL	BDL	.	.	
OCT	IGU	IGU	.	.	
NOV	BDL	BDL	.	.	
DEC	BDL	BDL	.	.	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
PHENOLICS (UG/L PHENOLICS)			DET'N LIMIT = 0.2	GUIDELINE = 2.00 (A3)
JAN	1.200	1.200	.	.
FEB	1.600	1.600	.	.
MAR	1.200	1.000	.	.
APR	1.200	1.200	.	.
MAY	1.600	1.600	.	.
JUN	.800 <T	1.600	.	.
JUL	.800 <T	.800 <T	.	.
AUG	.800 <T	1.000 <T	.	.
SEP	1.600	.600 <T	.	.
OCT	1.000 <T	.800 <T	.	.
NOV	.800 <T	.800 <T	.	.
DEC	.600 <T	.400 <T	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
VOLATILES				
BENZENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 5.0 (B1)
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.	.100 <T
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	.100 <T	.	.050 <T
JUN	BDL	.100 <T	.	.100 <T
JUL	.100 <T	1.050	.	.650
AUG	BDL	.500	.	.150 <T
SEP	BDL	BDL	.	.400 <T
OCT	BDL	BDL	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	.050 <T	.	.050 <T
TOLUENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 24.0 (B4)
JAN	BDL	.150 <T	.	.050 <T
FEB	BDL	BDL	.	.050 <T
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	.100 <T
MAY	BDL	.050 <T	.	BDL
JUN	BDL	.050 <T	.	.150 <T
JUL	BDL	1.700	.	.900
AUG	BDL	1.000	.	.300 <T
SEP	.050 <T	.500	.	.450 <T
OCT	BDL	BDL	.	ILA
NOV	BDL	.150 <T	.	.100 <T
DEC	BDL	.300 <T	.	.250 <T
ETHYLBENZENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 2.4 (B4)
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.	.050 <T
MAR	.100 <T	.050 <T	.	.050 <T
APR	BDL	.050 <T	.	.100 <T
MAY	BDL	BDL	.	BDL
JUN	BDL	BDL	.	.050 <T
JUL	BDL	.300 <T	.	.200 <T
AUG	BDL	.200 <T	.	BDL
SEP	BDL	.100 <T	.	.100 <T
OCT	BDL	BDL	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	BDL
M-XYLENE (UG/L)				DET'N LIMIT = .100 GUIDELINE = 300 (B4)
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.	BDL
MAR	BDL	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
O-XYLENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 300 (B4)
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	BDL
JUN	BDL	BDL	.	.200 <T
JUL	BDL	2.000 RMP	.	1.000 <T
AUG	BDL	1.000 RMP	.	.300 <T
SEP	BDL	.500 <T	.	.500 <T
OCT	BDL	BDL	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	BDL
O-XYLENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 300 (B4)
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.	BDL
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	.050 <T
MAY	BDL	.050 <T	.	.050 <T
JUN	BDL	.050 <T	.	.100 <T
JUL	BDL	.900	.	.450 <T
AUG	BDL	.600	.	.100 <T
SEP	BDL	.300 <T	.	.250 <T
OCT	BDL	BDL	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	BDL
STYRENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 46.5 (D2)
JAN	BDL	BDL	.	BDL
FEB	BDL	.100 <T	.	.200 <T
MAR	.250 <T	.150 <T	.	.150 <T
APR	.100 <T	.200 <T	.	.250 <T
MAY	BDL	.100 <T	.	.050 <T
JUN	BDL	.100 <T	.	.100 <T
JUL	BDL	.100 <T	.	.050 <T
AUG	BDL	BDL	.	.100 <T
SEP	BDL	BDL	.	BDL
OCT	BDL	.100 <T	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	.100 <T	.	.050 <T
CHLOROFORM (UG/L)				DET'N LIMIT = .100 GUIDELINE = 350 (A1+)
JAN	BDL	13.600	.	13.300
FEB	BDL	14.000	.	12.800
MAR	BDL	13.200	.	14.800
APR	.100 <T	16.000	.	16.000
MAY	BDL	21.500	.	20.500
JUN	.500 <T	27.500	.	29.800
JUL	.700 <T	30.200	.	23.800
AUG	BDL	29.700	.	30.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
SEP	BDL	23.000	.	22.900
OCT	BDL	13.900	.	ILA
NOV	.200 <T	15.800	.	13.800
DEC	BDL	19.800	.	17.700

111, TRICHLOROETHANE (UG/L) DET'N LIMIT = .020 GUIDELINE = 200 (D1)

JAN	BDL	BDL	.	.020 <T
FEB	BDL	BDL	.	BDL
MAR	.080 <T	BDL	.	BDL
APR	BDL	.020 <T	.	.020 <T
MAY	BDL	BDL	.	BDL
JUN	BDL	BDL	.	BDL
JUL	.020 <T	.020 <T	.	BDL
AUG	BDL	BDL	.	BDL
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	.020 <T

CARBON TETRACHLORIDE (UG/L) DET'N LIMIT = .200 GUIDELINE = 5.0 (D1)

JAN	BDL	.200 <T	.	.400 <T
FEB	BDL	.400 <T	.	.600 <T
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	BDL
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	BDL
SEP	BDL	BDL	.	BDL
OCT	BDL	.200 <T	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	BDL

DICHLOROBROMOMETHANE (UG/L) DET'N LIMIT = .050 GUIDELINE = 350 (A1+)

JAN	BDL	10.200	.	10.200
FEB	BDL	10.350	.	10.050
MAR	BDL	10.550	.	11.200
APR	.050 <T	11.100	.	11.000
MAY	BDL	2.850	.	11.900
JUN	BDL	13.600	.	13.700
JUL	BDL	14.800	.	12.400
AUG	BDL	16.800	.	15.700
SEP	BDL	13.000	.	12.850
OCT	BDL	10.700	.	ILA
NOV	.150 <T	10.900	.	10.250
DEC	BDL	12.600	.	11.550

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
CHLORODIBROMOMETHANE (UG/L)				DET'N LIMIT = .100 GUIDELINE = 350 (A1+)
JAN	BDL	4.900	.	4.600
FEB	BDL	5.100	.	4.800
MAR	BDL	5.400	.	5.000
APR	BDL	5.000	.	4.100
MAY	BDL	5.200	.	4.600
JUN	BDL	4.400	.	4.600
JUL	BDL	6.100	.	5.100
AUG	BDL	6.400	.	6.300
SEP	BDL	6.200	.	5.800
OCT	BDL	5.700	.	ILA
NOV	.100 <T	5.400	.	5.200
DEC	BDL	5.300	.	4.800
T-CHLOROETHYLENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 10.0 (C2)
JAN	BDL	BDL	.	.050 <T
FEB	BDL	BDL	.	BDL
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	BDL
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	.050 <T	.	.250 <T
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	ILA
NOV	BDL	BDL	.	BDL
DEC	BDL	BDL	.	BDL
BROMOFORM (UG/L)				DET'N LIMIT = .200 GUIDELINE = 350 (A1+)
JAN	BDL	.400 <T	.	.400 <T
FEB	BDL	.400 <T	.	.400 <T
MAR	BDL	.600 <T	.	.600 <T
APR	BDL	.600 <T	.	.400 <T
MAY	BDL	.400 <T	.	.400 <T
JUN	BDL	.200 <T	.	.400 <T
JUL	BDL	.600 <T	.	.400 <T
AUG	BDL	.800 <T	.	.800 <T
SEP	BDL	.600 <T	.	.600 <T
OCT	BDL	.600 <T	.	ILA
NOV	BDL	.600 <T	.	.600 <T
DEC	BDL	.400 <T	.	.200 <T
TOTL TRIHALOMETHANES (UG/L)				DET'N LIMIT = .500 GUIDELINE = 350 (A1)
JAN	BDL	29.300	.	28.900
FEB	BDL	30.250	.	28.650
MAR	BDL	29.750	.	31.600
APR	BDL	32.700	.	31.500

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WELLAND WSS 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
MAY	BDL	39.950	.	37.400
JUN	.500 <T	45.700	.	48.500
JUL	.700 <T	51.700	.	41.700
AUG	BDL	53.700	.	52.800
SEP	BDL	42.800	.	42.150
OCT	BDL	30.900	.	ILA
NOV	BDL	32.700	.	29.850
DEC	BDL	38.000	.	34.300

TRACE LEVELS OF TOLUENE ARE LABORATORY ARTIFACTS DERIVED FROM THE ANALYTICAL METHODOLOGY.

TRACE LEVELS OF STYRENE ARE CONSIDERED TO BE LABORATORY ARTIFACTS RESULTING FROM THE LABORATORY SHIPPING CONTAINERS.

Table 6

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML (A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL (A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROBUTADIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	2000. (B4)
PENTACHLOROPHENOL	NG/L	50.	30000. (B4)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	°C	N/A	<15 °C (A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500 (A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20 (A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100 (A4)
MAGNESIUM	MG/L	.05	30. (F2)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
NITRITE	MG/L	.001	1.0 (A1)
TOTAL NITRATES	MG/L	.02	10. (A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A
PH	DMSNLESS	N/A	6.5-8.5(A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A
PHOSPHORUS TOTAL	MG/L	.002	.40(F2)
TOTAL SOLIDS	MG/L	1.	500. (A3)
TURBIDITY	FTU	.02	1.0 (A1)
METALS			
ALUMINUM	UG/L	.050	100. (A4)
ANTIMONY	UG/L	.050	10. (F3)
ARSENIC	UG/L	.050	50. (A1)
BARIUM	UG/L	.020	1000. (A1)
BORON	UG/L	.200	5000. (A1)
BERYLLIUM	UG/L	.010	0.20 (H)
CADMIUM	UG/L	.050	5.0 (A1)
COBALT	UG/L	.020	1000. (H)
CHROMIUM	UG/L	.100	50. (A1)
COPPER	UG/L	.100	1000. (A3)
IRON	UG/L	5.0	300. (A3)
MERCURY	UG/L	.01	1.0 (A1)
MANGANESE	UG/L	.050	50. (A3)
MOLYBDENUM	UG/L	.020	500. (H)
NICKEL	UG/L	.100	50. (F3)
LEAD	UG/L	.020	50. (A1)
SELENIUM	UG/L	.200	10. (A1)
SILVER	UG/L	.020	50. (A1)
STRONTIUM	UG/L	.100	2000. (H)
THALLIUM	UG/L	.010	13. (D4)
TITANIUM	UG/L	.100	N/A
URANIUM	UG/L	.020	20. (A2)
VANADIUM	UG/L	.020	100. (H)
ZINC	UG/L	.020	5000. (A3)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0 (A3)
PESTICIDES & PCB			
ALDRIN	NG/L	1.0	700. (A1)
AMETRINE	NG/L	50.	300000. (D3)
ATRAZINE	NG/L	50.	60000. (B3)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700. (G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300. (G)
GAMMA HEXACHLOROCYCLOHEXANE(LINDANE)	NG/L	1.0	4000. (A1)
ALPHA CHLORDANE	NG/L	2.0	7000. (A1)
GAMMA CHLORDANE	NG/L	2.0	7000. (A1)
BLADEX	NG/L	100.	10000. (B3)
DIELDRIN	NG/L	2.0	700. (A1)
METHOXYCHLOR	NG/L	5.0	900000. (B1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000. (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000. (D4)
ENDRIN	NG/L	4.0	200. (A1)
ENDOSULFAN SULPHATE(THIODAN SULPHATE)	NG/L	4.0	N/A
HEPTACHLOR EPOXIDE	NG/L	1.0	3000. (A1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRATONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPAZINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)
POLYAROMATIC HYDROCARBONS				
PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)
BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A	
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A	
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A	
BENZO(B)CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	
SPECIFIC PESTICIDES				
TOXAPHENE	NG/L	N/A	5000.	(A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	200000.	(B4)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000.	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID	NG/L	200.	18000.	(B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	120000.	(B1)
PICLORAM	NG/L	100.	190000.	(B3)
SILVEX (2,4,5-TP)	NG/L	50.	10000.	(A1)
DIAZINON	NG/L	20.	20000.	(B1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000.	(G)
GUTHION(AZINPHOSMETHYL)	NG/L	N/A	20000.	(B1)
MALATHION	NG/L	20.	190000.	(B1)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000.	(A1)
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	50000.	(B1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
PHORATE (THIMET)	NG/L	20.	2000.	(B3)
RELDAN	NG/L	20.	N/A	
RONNEL	NG/L	20.	N/A	
AMINOCARB	NG/L	N/A	N/A	
BENONYL	NG/L	N/A	N/A	
BUX (METALKAMATE)	NG/L	2000.	N/A	
CARBOFURAN	NG/L	2000.	90000.	(B1)
CICP (CHLORPROPHAM)	NG/L	2000.	350000.	(G)
DIALLATE	NG/L	2000.	30000.	(H)
EPTAM	NG/L	2000.	N/A	
IPC	NG/L	2000.	N/A	
PROPOXUR (BAYGON)	NG/L	2000.	90000.	(G)
SEVIN (CARBARYL)	NG/L	200.	90000.	(B1)
SUTAN (BUTYLATE)	NG/L	2000.	245000.	(D3)
VOLATILES				
BENZENE	UG/L	.050	5.0	(B1)
TOLUENE	UG/L	.050	24.0	(B4)
ETHYLBENZENE	UG/L	.050	2.4	(B4)
PARA-XYLENE	UG/L	.100	300.	(B4)
META-XYLENE	UG/L	.100	300.	(B4)
ORTHO-XYLENE	UG/L	.050	300.	(B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0	(D1)
ETHLYENE DIBROMIDE	UG/L	.05	.05	G)
METHYLENE CHLORIDE	UG/L	.500	50.	(B1)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	70.	(D5)
1,1-DICHLOROETHANE	UG/L	.100	N/A	
CHLOROFORM	UG/L	.100	350.	(A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200.	(D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0	(D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0	(B1)
1,2-DICHLOROPROPANE	UG/L	.050	6.0	(D5)
TRICHLOROETHYLENE	UG/L	.100	50.	(B1)
DICHLOROBROMOMETHANE	UG/L	.050	350.	(A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	.60	(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350.	(A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0	(C2)
BROMOFORM	UG/L	.200	350.	(A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17	(D4)
CHLOROBENZENE	UG/L	.100	60.	(D5)
1,4-DICHLOROBENZENE	UG/L	.100	1.0	(B4)
1,3-DICHLOROBENZENE	UG/L	.100	130.	(G)
1,2-DICHLOROBENZENE	UG/L	.050	3.0	(B4)
TRIFLUOROCHLOROTOLUENE	UG/L	.100	N/A	
TOTAL TRIHALOMETHANES	UG/L	.500	350.	(A1)
STYRENE	UG/L	.05	140.	(D5)

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. Currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant

visit. During the initial assessment of the plant and distribution system, the questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in

this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant,

preferably a lab area;

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used,

dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyse, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems

may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in figure 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs: Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines, which are documented in the Parameter Reference

Information, may be used. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

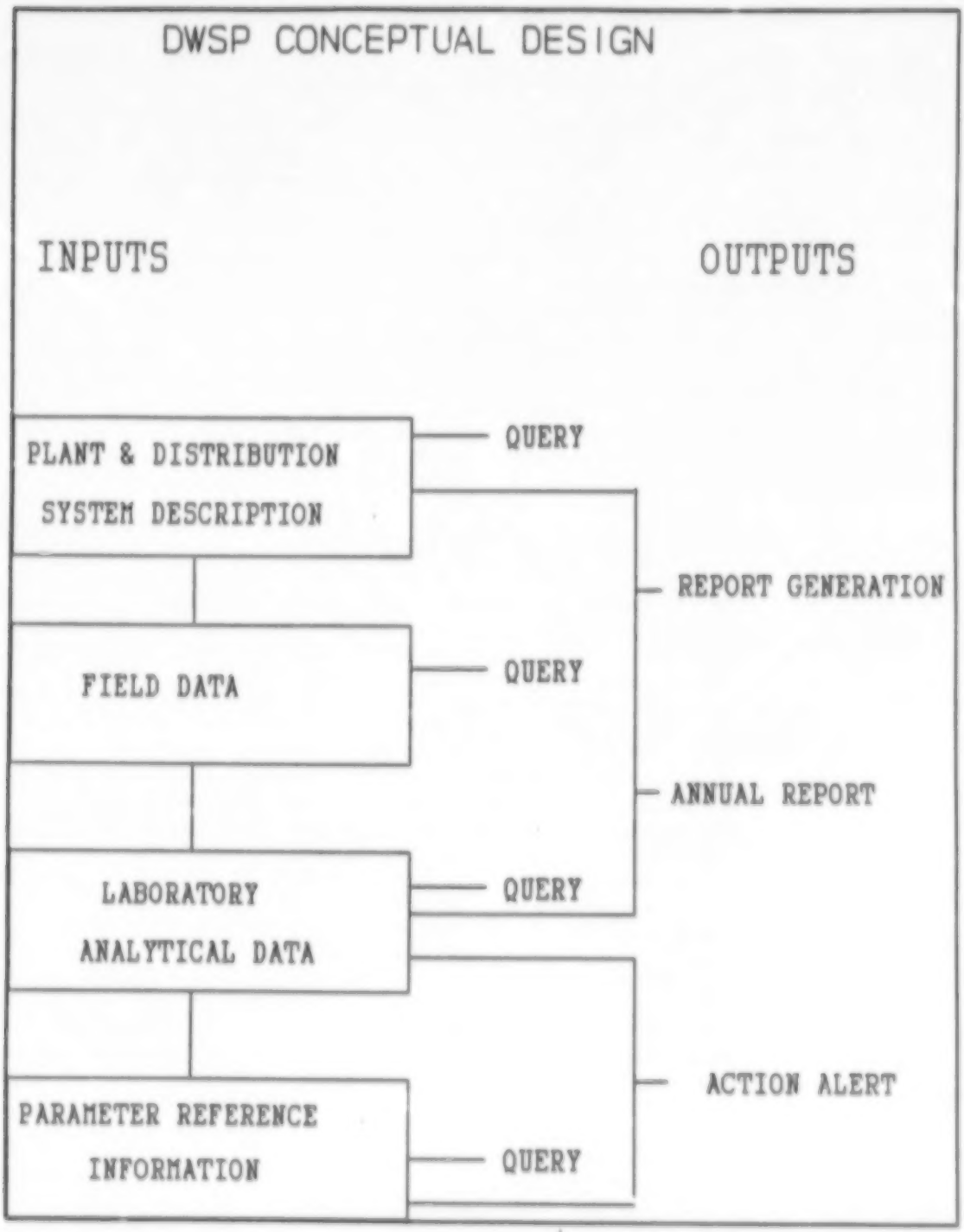
DWSP CONCEPTUAL DESIGN
INPUTS
OUTPUTS
PLANT & DISTRIBUTION SYSTEM DESCRIPTION
FIELD DATA
LABORATORY ANALYTICAL DATA
PARAMETER REFERENCE INFORMATION
QUERY
QUERY
QUERY
QUERY
REPORT GENERATION
ANNUAL REPORT
ACTION ALERT

FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

PARAMETER REFERENCE

(B2001P)
BENZENE

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE
CAS#: 71432
MOLECULAR FORMULAE: C_6H_6
DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L
SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27),
CYCLOHEXATRIENE (41)
CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE,
NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE,
AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)
PROPERTIES:
SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)
THRESHOLD ODOUR: NO DATA
THRESHOLD TASTE: 0.5 MG/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING
ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL
TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE
MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL
QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY
SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL
TAR DISTILLATION, FOOD PROCESSING, TANNING.
USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE
MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN
PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY,
DEGREASING AND CLEANSING AGENT, GASOLINE.
TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES
MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS,
CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE;
CHRONIC - ANEMIA AND LEUKEMIA (45).
CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN
REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALU
FOLLOWED BY SEDIMENTATION, COAGULATION AN
FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).
MOLECULAR WEIGHT: 78.12 GRAMS
MELTING POINT: 5.5 DEGREES C (27)
BOILING POINT: 80.1 DEGREES C (27)
SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)
VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES
HENRY'S LAW CONSTANT: 0.00555 ATM M_3/MOLE
LOG OCT./WATER PAR.COEFF: K=1.0 1/N=1.6 R=.97 PH=5.

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC),(OWTRI),(OAPAHX)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide (Caution: NaOH is corrosive)

Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and $KCrO_7$ corrosive)
Phenols	-250 mL clear glass bottle -do <u>not</u> rinse bottle -fill to top of label as marked

<u>Steps</u>

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear palstic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC),(OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide (Caution: NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (Caution: HNO_3 and $K_2Cr_2O_7$ corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for five minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), tubidity and pH on submission sheet.